

**What Is Claimed Is:**

1        1. A hysteresis circuit for a comparator, said  
2 comparator comprising an input stage including a first  
3 transistor and a second transistor, each having a gate  
4 terminal serving as one of two input terminals of said  
5 comparator to receive one of two input signals, said  
6 comparator further comprising a constant current source  
7 connected to supply a constant current to said input stage  
8 of said comparator, said hysteresis circuit comprising:

9        a first resistor element coupled between a source  
10            terminal of said first transistor and said constant  
11            current source of said comparator;

12        a second resistor element coupled between a source  
13            terminal of said second transistor and said constant  
14            current source of said comparator;

15        a first current generating means for supplying a first  
16            current to said source terminal of said first  
17            transistor and deriving a forth current out from said  
18            source terminal of said second transistor when an  
19            output signal from an output terminal of said  
20            comparator is a first logic value; and

21        a second current generating means for supplying a third  
22            current to said source terminal of said second  
23            transistor and deriving a second current out from  
24            said source terminal of said first transistor when  
25            said output signal from said output terminal of said  
26            comparator is a second logic value.

1        2. The hysteresis circuit for a comparator of claim 1,  
2 wherein said first to said forth currents have the same  
3 current value.

1        3. The hysteresis circuit for a comparator of claim 1,  
2 wherein said first to said forth currents are equal to the  
3 constant current produced by said constant current source  
4 of said comparator.

1        4. The hysteresis circuit for a comparator of claim 1,  
2 wherein said first resistor element and said second  
3 resistor element have the same resistance value.

1        5. The hysteresis circuit for a comparator of claim 1,  
2 wherein said first transistor and said second transistor  
3 are PMOS transistors.

1        6. The hysteresis circuit for a comparator of claim 1,  
2 wherein said first to said forth currents have the same  
3 current value, wherein said first resistor element and said  
4 second resistor element have the same resistance value, and  
5 wherein a single-side hysteresis width generated by said  
6 hysteresis circuit for said comparator is equal to said  
7 current value multiplied by twice said resistance value  
8 while a double-side hysteresis width generated by said  
9 hysteresis circuit for said comparator is equal to twice  
10 the single-side hysteresis width.

1        7. A hysteresis circuit for a comparator, said  
2 comparator comprising an input stage including a first  
3 transistor and a second transistor, each having a gate  
4 terminal serving as one of two input terminals of said  
5 comparator to receive one of two input signals, said  
6 comparator further comprising a constant current source  
7 connected to supply a constant current to said input stage  
8 of said comparator, said hysteresis circuit comprising:  
9        a first resistor element coupled between a source

10 terminal of said first transistor and said constant  
11 current source of said comparator;  
12 a second resistor element coupled between a source  
13 terminal of said second transistor and said constant  
14 current source of said comparator;  
15 a switching means including a first switch element, a  
16 second switch element, a third switch element and  
17 a forth switch element, said switching means being  
18 controlled that said first switch element and said  
19 forth switch element are ON and said second switch  
20 element and said third switch element are OFF if an  
21 output signal from an output terminal of said  
22 comparator is a first logic value, and that said  
23 first switch element and said forth switch element  
24 are OFF and said second switch element and said third  
25 switch element are ON if said output signal from said  
26 output terminal of said comparator is a second logic  
27 value;  
28 a first constant current source element for selectively  
29 supplying a constant current to said source terminal  
30 of said first transistor through said first switch  
31 element;  
32 a second constant current source element for selectively  
33 deriving a constant current out from said source  
34 terminal of said first transistor through said  
35 second switch element;  
36 a third constant current source element for selectively  
37 supplying a constant current to said source terminal  
38 of said second transistor through said third switch  
39 element; and  
40 a forth constant current source element for selectively  
41 deriving a constant current out from said source

42 terminal of said second transistor through said  
43 forth switch element.

1 8. The hysteresis circuit for a comparator of claim 7,  
2 wherein the constant currents produced by said first to said  
3 forth constant current source elements have the same  
4 current value.

1 9. The hysteresis circuit for a comparator of claim 7,  
2 wherein the constant currents produced by said first to said  
3 forth constant current source elements are equal to the  
4 constant current produce by said constant current source of  
5 said comparator.

1 10. The hysteresis circuit for a comparator of claim 7,  
2 wherein , said first resistor element and said second  
3 resistor element have the same resistance value.

1 11. The hysteresis circuit for a comparator of claim 7,  
2 wherein , said first transistor and the second transistor  
3 are PMOS transistors.

1 12. The hysteresis circuit for a comparator of claim 7,  
2 wherein the constant currents produced by said first to said  
3 forth constant current source elements have the same current  
4 value, wherein said first resistor element and said second  
5 resistor element have the same resistance value, and wherein  
6 a single-side hysteresis width generated by said hysteresis  
7 circuit for said comparator is equal to said current value  
8 multiplied by twice said resistance value while a  
9 double-side hysteresis width generated by said hysteresis  
10 circuit for said comparator is equal to twice the single-side  
11 hysteresis width.

1        13. A hysteresis circuit for a comparator, said  
2 comparator comprising an input stage including a first  
3 transistor and a second transistor, each having a gate  
4 terminal serving as one of two input terminals of said  
5 comparator to receive one of two input signals, said  
6 comparator further comprising a constant current source  
7 connected to supply a constant current to said input stage  
8 of said comparator, said hysteresis circuit comprising:

9        a first and a second resistor elements having the same  
10        resistance value, said first resistor element being  
11        coupled between a source terminal of said first  
12        transistor and said constant current source of said  
13        comparator, and said second resistor element being  
14        coupled between a source terminal of said second  
15        transistor and said constant current source of said  
16        comparator;

17        a first to a forth constant current source elements, each  
18        for producing a constant current having the same  
19        current value as the constant current produced by  
20        said constant current source of said comparator;

21        a first switch element coupled between said first  
22        constant current source element and said source  
23        terminal of said first transistor so that said first  
24        constant current source element selectively  
25        supplies a constant current to said source terminal  
26        of said first transistor;

27        a second switch element coupled between said second  
28        constant current source element and said source  
29        terminal of said first transistor so that said second  
30        constant current source element selectively derives  
31        a constant current out from said source terminal of  
32        said first transistor;

33       a third switch element coupled between said third  
34       constant current source element and source terminal  
35       of said second transistor so that said third constant  
36       current source element selectively supplies a  
37       constant current to said source terminal of said  
38       second transistor;  
39       a forth switch element coupled between said forth  
40       constant current source element and said source  
41       terminal of said second transistor so that said forth  
42       constant current source element selectively derives  
43       a constant current from said source terminal of said  
44       second transistor; and  
45       a switch element control means for controlling ON/OFF  
46       operations of said first to said forth switch  
47       elements so that said first switch element and said  
48       forth switch element are ON and said second switch  
49       element and said third switch element are OFF if an  
50       output signal from an output terminal of said  
51       comparator is a first logic value and that said first  
52       switch element and said forth switch element are OFF  
53       and said second switch element and said third switch  
54       element are ON if said output signal from said output  
55       terminal of said comparator is a second logic value.

1       14. The hysteresis circuit for a comparator of claim 13,  
2       wherein a single-side hysteresis width generated by said  
3       hysteresis circuit for said comparator is equal to said  
4       current value of said constant current multiplied by twice  
5       said resistance value of said resistor elements while a  
6       double-side hysteresis width generated by said hysteresis  
7       circuit for said comparator is equal to twice the single-side  
8       hysteresis width.